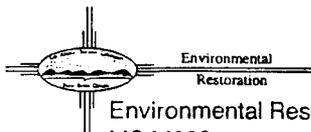


file under all three indexes

# Los Alamos National Laboratory

UNIVERSITY OF CALIFORNIA



Environmental Restoration Project  
MS M992  
Los Alamos, New Mexico 87545  
505-667-0808/FAX 505-665-4747

Date: September 30, 1996  
Refer to: EM/ER:96-527

1.4.2.6.1 .7;2.2  
.16.2.2  
.23.2.2

Mr. Ted Taylor  
Los Alamos Area Office  
US Department of Energy, MS A316  
Los Alamos, NM 87544

**SUBJECT: VCA COMPLETION REPORTS FOR TAs -11, -16, -33, AND -46, PRSs 11-001(c), 16-026(m-p), 16-029(k,l,q,s,t,u), C-16-064, C-16-067, 33-007(c), 33-010(b), AND 46-003(h) ACTIVITIES**

Dear Ted:

Enclosed for your review and approval please find a copy of the Voluntary Corrective Action (VCA) Completion Reports for Technical Areas (TAs) -11, -16, -33, and -46, Potential Release Sites (PRSs) 11-001(c), 16-026(m-p), 16-029(k,l,q,s,t,u), C-16-064, C-16-067, 33-007(c), 33-010(b), and 46-003(h) for cleanup activities completed in Fiscal Year 1996. Also enclosed are the VCA Approval/Disapproval Forms for your signature indicating your approval or disapproval of the reports. If you do not approve these reports, please include a brief description of the reason(s) for disapproval.

Please note that the VCA Completion Reports for TA-16 include Resource Conservation and Recovery Act Facility Investigation (RFI) information. The following PRSs have RFI results in the VCA Completion Reports: TA-16 90's Line, PRSs 16-026(m-p), 16-029(k,l,q,s,t,u), C-16-064, and C-16-067. We would like to propose that the VCA reports covering RFI results be counted as both RFI reports and VCA reports.

Once we have received your approval of these reports, we will submit them to the regulators for their review/approval.

Your Field Project Coordinator participated in developing and reviewing these reports. The Certifications of Completion have been signed and are included in the enclosed reports.

*Attachment 4*



3447

Mr. Ted Taylor  
EM/ER:96-527

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September 30, 1996

If you have any questions, please call Roy Michelotti at (505) 665-7444 or Joe Mose at (505) 667-5808. Thank you for your cooperation in this matter.

Sincerely,

  
Jorg Jansen  
Program Manager

JJ/el

- Enclosures: (1) VCA Completion Reports for TAs -11, -16, -33, and -46, PRS(s) 11-001(c), 16-026(m-p), 16-029(k,l,q,s,t,u), C-16-064, C-16-067, 33-007(c), 33-010(b), and 46-003(h)  
(2) Certifications of Completion  
(3) VCA Approval/Disapproval Forms  
(4) VCA Reports with RFI Report Results

Cy (w/o encs.):

T. Baca, EM, MS J591  
D. Bradbury, EM/ER, MS M992  
T. Glatzmaier, DDEES/ER, MS M992  
D. McInroy, EM/ER, MS M992  
R. Michelotti, CST-18, MS E525  
J. Mose, LAAO, MS A316  
EM/ER File, MS M992  
RPF, MS M707

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LA-UR-96-3349

**Voluntary Corrective  
Action Report  
for  
Solid Waste  
Management Unit**

11-001(c)

Field Unit 3

Environmental  
Restoration  
Project

September 1996

A Department of Energy  
Environmental Cleanup Program

**Los Alamos**  
NATIONAL LABORATORY

LA-UR-96-3349

Received by ER-RPF

FEB 01 1999

MA



2.0 SITE CHARACTERIZATION PRIOR TO CLEANUP ACTIVITY

RFI sampling was performed between September 19 and September 22, 1995. The field activities implemented at the site included selection of sampling locations, land, geophysical, and screening surveys, and field sampling activities.

2.1 RFI Information/Other Decision Data

2.1.1 Field Investigation for SWMU 11-001(c)

SWMU 11-001(c) is discussed in the VCA plan and the RFI work plan, subsection 5.16 (LANL 1993, 1094). Phase I investigation sampling at SWMU 11-001(c) consisted of four hand-augered cores; one selected from each quadrant of the site. Cores were augered to the soil/tuff interface. Two samples were collected from each core hole, the 0-18 in. deep section and the 6 in. section above the soil/tuff interface or 6 in. bottom of the core. The surface sample was collected with a spade or scoop, the deeper sample with a hand auger. One location (11-0001) was biased to the presence of a detonator, that was removed. These samples were submitted for laboratory analysis and are summarized below in Table 2.1-1.

TABLE 2.1-1: SAMPLE DEPTHS AND LOCATIONS

SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (ft)
0311-95-0001	11-0001	NE edge of pit, on lip	0 -0.5
0311-95-0002*	11-0001	NE edge of pit, on lip	0.5-1
none	11-0001	soil/tuff interface	0.7
0311-95-0003	11-0002	NW corner of pit, on lip	0 -0.3
0311-95-0004*	11-0002	NW corner of pit, on lip	0.4-0.7
none	11-0002	soil/tuff interface	0.6
0311-95-0005	11-0003	SW corner of pit, below lip	0 -0.5
0311-95-0006*	11-0003	SW corner of pit, below lip	0.5-1
none	11-0003	soil/tuff interface	0.75
0311-95-0007*	11-0004	SE corner of pit, below lip	0.5-1
0311-95-0008*	11-0004	SE corner of pit, below lip	1-1.3
none	11-0004	soil/tuff interface	1.1

\* = sampled using a hand auger

All samples were screened for radioactivity and HE; all results were negative. All samples were also screened for volatile organic compounds (VOCs) using a photo ionization detector (PID). These screening results are located in Table 2.1-2.

TABLE 2.1-2  
PID SCREENING RESULTS FOR VOCS

SAMPLE ID	LOCATION ID	SCREENING RESULT (ppm)
0311-95-0002	11-0001	5.0
0311-95-0003	11-0002	1.2
0311-95-0005	11-0003	0.8
0311-95-0006	11-0003	3.0
0311-95-0007	11-0004	1.5
0311-95-0008	11-0004	6.0

Table 2.1-3 lists the analytical request numbers for samples collected at SWMU 11-001(c). Figure 2.1-1 shows the locations of the laboratory samples.

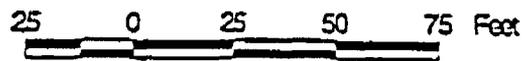
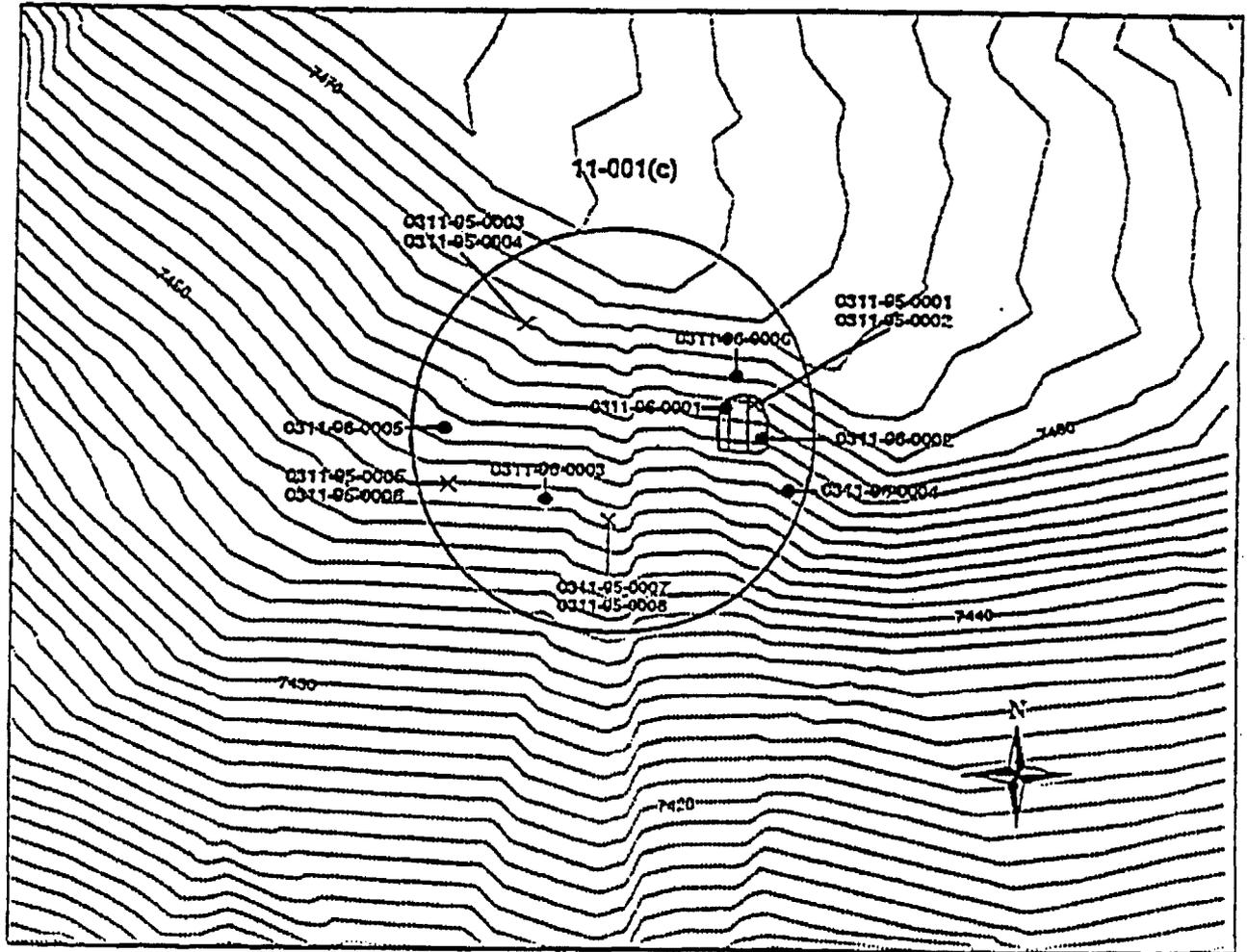
TABLE 2.1-3  
SUMMARY OF ANALYTICAL REQUEST NUMBERS FOR SAMPLES COLLECTED  
AT SWMU 11-001(c)

LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	SVOCs <sup>a</sup>	METALS	TOTAL URANIUM	HE <sup>b</sup>
11-0001	0311-95-0001	0-0.5	Soil	1192	1193	1194	1192
11-0001	0311-95-0002	0.5-1	Soil	1192	1193	1194	1192
11-0002	0311-95-0003	0-0.3	Soil	1192	1193	1194	1192
11-0002	0311-95-0004	0.4-0.7	Soil	1192	1193	1194	1192
11-0003	0311-95-0005	0-0.5	Soil	1192	1193	1194	1192
11-0003	0311-95-0006	0.5-1	Soil	1192	1193	1194	1192
11-0004	0311-95-0007	0.5-1	Soil	1192	1193	1194	1192
11-0004	0311-95-0008	1-1.3	Soil	1192	1193	1194	1192

<sup>a</sup>SVOCs = Semivolatile organic compounds.

<sup>b</sup>HE = High explosives.

Fig. 2.1-1 Locations of samples at SWMU 11-001(c).



- x Analytical sample location
- Verification sample location

-  Excavation boundary
-  Contours - 2 foot



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VCA Report for SWMU 11-001(c)

TABLE 2.1-4  
 INORGANICS WITH CONCENTRATIONS GREATER THAN BACKGROUND UTLs FOR SWMU 11-001(c)

SAMPLE ID	DEPTH (ft)	SOIL/ROCK UNIT	ALUMINUM (mg/kg)	ARSENIC (mg/kg)	BARIUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	LEAD (mg/kg)	MANGANESE (mg/kg)	NICKEL (mg/kg)	VANADIUM (mg/kg)
LANL UTL (a) (So3)	N/A <sup>a</sup>	N/A	38 700	7.82	315	19.3	15.5	23.3	714	15.2	41.9
LANL UTL (Ob14)	N/A	N/A	6 200	2	42	5.4	1.6	4	370	2	9.5
SAL <sup>b</sup>	N/A	N/A	77 700	NC <sup>c</sup>	5 300	210	2 800	400	N/A	1 500	540
0311-95-0001	0-0.5	So3	12 300	21.2	171	10.3	19	40.2	178 (J-) <sup>d</sup>	8.5 (J+) <sup>e</sup>	23.6
0311-95-0002	0.5-1	Ob14	5 890	6.5	127	6.7	8.5	12.8	249 (J-)	5.8 (J+)	15.9
0311-95-0004	0.4-0.7	Ob14	3 530	0.84	59.3	3.5	3.5	11.4	407 (J-)	2.4 (J+)	10.8
0311-95-0006	0.5-1	Ob14	6 960	1.7	26.2	4.1	4	9.3	143 (J-)	3.4 (J+)	9.1
0311-95-0008	1-1.3	Ob14	5 320	0.95	24.6	3	3.9	3	178 (J-)	3.4 (J+)	6.1

<sup>a</sup>N/A = Not analyzed.

<sup>b</sup>SAL = Screening action level.

<sup>c</sup>NC = Not calculated.

<sup>d</sup>J- = Analyte is present. Concentration reported is an estimated value, with a low bias.

<sup>e</sup>J+ = Analyte is present. Concentration reported is an estimated value, with a high bias.



### 3.0 REMEDIAL ACTIVITIES AND RESULTS OF CONFIRMATORY SAMPLING

#### 3.1 Cleanup Level Derivation

The chemicals of potential concern (COPCs) considered during the VCA planning were identified by a screening assessment that used the results of the Phase I investigation at SWMU 11-001(c). The screening assessment is based on simple comparisons of site-specific analytical results with UTLs and SALs. UTLs provide an estimate of the expected background value. SALs are conservative levels that indicate whether a site requires further evaluation. The screening assessment insures that the VCA of this site will focus on the COPCs. Only those chemicals present in concentrations greater than their SALs, or greater than the background UTL value in cases where no SAL is available, have calculated cleanup levels. Based on the results of the screening assessment for SWMU 11-001(c), the only COPC identified is arsenic, detected at a maximum concentration of 21 mg/kg. A soil cleanup level for arsenic has been established at 24 mg/kg for this VCA.

The soil cleanup level of 24 mg/kg for arsenic is based on human health risks using an industrial land-use exposure scenario. The equations and parameter values used in the calculation are identical to those specified in the Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goal (PRG) Tables for industrial land use (EPA 1995, 1351) with the exception that the target lifetime incremental cancer risk value for this carcinogen has been set at 1 in 100 000. The PRG derived from this document becomes the site-specific cleanup value for this SWMU. The cleanup value or PRG considers exposure pathways via soil ingestion, dust inhalation, and dermal absorption.

The target value for lifetime incremental cancer risk was increased from the value of 1 in 1 000 000 ( $10^{-6}$ ) used in EPA Region IX's PRG Tables to 1 in 100 000 ( $10^{-5}$ ) because this value lies at the midpoint of EPA's target risk range of  $10^{-6}$  to  $10^{-4}$  (EPA 1990, 0559). A value above the lowest level of risk is an appropriate choice at this site because: 1) the population potentially exposed under the industrial land-use scenario at this secured and remote site is restricted to a small number of workers who may perform maintenance activities near the area, and 2) a risk level of 1 in 1 000 000 results in a cleanup level (approximately 3 mg/kg) within the lower range of the background arsenic distribution for the soils at Los Alamos (the LANL UTL for arsenic in all soil horizons is 7.82 mg/kg).

### 3.2 Remedial Implementation

The remedial activities consisted of removing: 1) asbestos, 2) firing site debris, especially in the area east of the pit, and 3) soil and debris in the area of the high arsenic value. These activities took place at SWMU 11-001(c) September 3-6, 1996. Figure 2.1-1 shows the SWMU boundary and the Phase I investigation sample locations, as well as the locations for the confirmatory samples.

Chunks of asbestos present at the site were removed and disposed of. The entire SWMU area was visually inspected and debris that looked like military debris was picked up and disposed of. The debris cleanup focused on the area east of the former firing pit foundations where it appeared that firing debris bulldozed off the firing pad accumulated.

Southeast of the firing pit is sampling location 11-0001. Phase I investigation indicated that arsenic was present at 21 ppm at the 0-6 inch depth. The area around this location appears to have a different soil than the soils covering the rest of the site. This unique non-native soil may have been due to the bulldozing of debris or it may have been used as fill. The unique soil surrounding sampling location 11-0001 was removed using suction equipment. Soil was removed to the tuff interface, which varied in depth from 1.5 ft near location 11-0001 to a few inches in the downhill portion of the excavation. The excavation area extended approximately 3 ft. to the east and to the west of location 11-0001, approximately 3 ft. to the north of location 11-0001, and approximately 10 ft to the south of location 11-0001. Debris present in this area was removed in the process of removing soil.

The cleanup deviated from the original plan slightly. The VCA plan referred to a region within the SWMU where non-native soil had been bulldozed or filled in over the native soil. This area of non-native soil was located near the elevated arsenic sample location (location 11-0001). The VCA plan called for removal of the non-native soil surrounding the elevated arsenic value. During the cleanup, it became apparent the area containing non-native soil, a white pumice-based material, was large and extensive, without a discrete boundary around location 11-0001. The non-native soil was removed from a distinct area surrounding location 11-0001 and the larger remaining mass of non-native soil was sampled to confirm that the removal of non-native soil was adequate. Following cleanup activities, the area of soil removal was regraded. Because the VCA area was bare of vegetation before cleanup, it was not reseeded after cleanup. LANL's Water Quality Group verbally approved of these activities.

### 3.3 Confirmatory Sampling

A total of six confirmatory samples were collected during the VCA, rather than the originally intended five samples. Three samples were collected from areas where soil and/or debris was removed. Two samples from random locations within the SWMU boundary where there was no soil or debris removal. One sample was collected from an area containing non-native soil. Samples were analyzed for inorganics only.

Of the six verification samples, two samples were collected at a depth of 0-6 in. from the area where the highest arsenic value was found. One sample was collected near location 11-0001, and one sample was collected downgradient from location 11-0001. Both of these samples are located in the area where soil and debris appear to have been pushed off the firing site pad. The third verification sample was collected at the 6 - 12 in. depth from the east side of the firing pit. Prior to the VCA, there was debris in this area and the area was not sampled during Phase I investigation. The fourth and fifth verification samples were collected at a depth of 0-6 in. from random locations where there was no soil or debris removal. Sample 0316-96-0003 was biased to an area that had debris present. The debris was removed before the location was sampled. Finally a sixth sample was collected from the area of non-native soil to insure that cleanup in the non-native soil surrounding the elevated arsenic value had been sufficient.

Sample results showed no inorganics at levels greater than UTLs. Arsenic was well below the cleanup level. Arsenic values ranged from 2.2 mg/kg to 4.7 mg/kg. The arsenic values were below the UTL for all soil horizons. This UTL was selected because of the disturbed nature of the soils at the PRS and the addition of non-native soils to site. Inorganic analytical results are presented in Appendix D.



**4.2 Method of Management and Disposal**

Contaminated soil was removed from the site by suction and placed in 55-gal. steel drums. The waste was managed in accordance with RCRA solid waste requirements. These drums will be disposed of in an industrial landfill. Sampling waste, site refuse, and personal protective equipment was disposed of in a municipal landfill. Asbestos waste was double bagged and will be managed in accordance with the Toxic Substances Control Act. The asbestos waste will be disposed of by Johnson Controls, Inc., a licensed asbestos contractor.

## 5.0 REFERENCES

EPA (US Environmental Protection Agency), March 8, 1990. "National Oil and Hazardous Substances Pollution Contingency Plan." Final Rule, 40 CFR Part 300, Federal Register, Vol. 55, No. 46, p. 8666. (EPA 1990, 0559)

EPA (US Environmental Protection Agency), April 10, 1990. Module VIII of RCRA Permit No. NM0890010515, EPA Region 6, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region 6, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 0306)

EPA (US Environmental Protection Agency), August 1, 1996. "Region IX Preliminary Remediation goals (PRGs) 1996," San Francisco, California. (EPA 1995, 1351)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory Report LA-UR-93-1196, Los Alamos, New Mexico. (LANL 1993, 1094)

LANL (Los Alamos National Laboratory), September 1996. "Voluntary Corrective Action Plan for Solid Waste Management Unit 11-001(c)," Los Alamos National Laboratory Report LA-UR-96-2000, Los Alamos, New Mexico. (LANL 1996, 1356)

**APPENDIXES**

**APPENDIX A      QA/QC DISCUSSION**

The characterization data presented in section 2.0 has been validated and the validation qualifiers are attached. The confirmatory data presented in section 3.0 has not been independently validated. The confirmatory data had few laboratory assigned qualifiers associated with it. The laboratory qualifiers indicated that duplicate recovery of lead was outside the acceptable range and that the spike recovery for manganese was outside the acceptable range. However, neither of these metals was a COPC at this site. The lead and manganese data are not near action levels and therefore are not affected by out-of-range recovery values. All data are considered valid for the purposes of this report.

APPENDIX B RFI CHARACTERIZATION DATA

Validated data are available in the Facility for Information, Management, Analysis and Display (FIMAD) or upon request.

**APPENDIX C COST COMPARISON**

Table C-1 compares the estimated and actual costs associated with the VCA. Actual costs include estimates made for activities during the month of September.

**TABLE C-1**

**COST ESTIMATES**

<b>ACTIVITY</b>	<b>ESTIMATED COST</b>	<b>ACTUAL COST</b>
Pre-field activities (field preparation and plan development)	\$9 000	9 738\$
Cleanup	\$25 000	9 332\$
Waste management disposal	\$1 500	1 037\$
Sampling/analytical	\$2 000	2 035\$
Post-field activities and report	\$9 000	3 991\$
<b>Total Estimated Cost</b>	<b>\$46 500</b>	<b>26 133\$</b>

**APPENDIX D      CONFIRMATORY SAMPLING RESULTS TABLE**

Table D-1 lists all the samples collected during confirmatory sampling. The results shown are those detected at levels above EQLs. All samples are compared to the soil UTL regardless of depth due to the heterogeneity of soils at PRS 11-001(c).

CH. 11-001(c) 11-001(c)

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VCA Report for SWMU 11-001(c)

TABLE D-1  
INORGANICS WITH CONCENTRATIONS GREATER THAN EQLs

SAMPLE ID	LOCATION ID	DEPTH (ft)	ALUMINUM (mg/kg)	ARSENIO (mg/kg)	BARIUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	LEAD (mg/kg)	MANGANESE (mg/kg)	VANADIUM (mg/kg)	ZINC (mg/kg)
LANL UTL (all soil)	N/A	N/A <sup>a</sup>	38700	7.82	315	19.3	15.5	23.3	714	41.9	50.8
SAL <sup>b</sup>	N/A	N/A	77700	NO <sup>c</sup>	5300	210	2800	400	130	540	23000
0311-96-0001	11-0013	0-0.5	2780	2.3	182	4.9	6.2	4.5	393	17	16.4
0311-96-0002	11-0014	0-0.5	8480	4.7	160	6	5	13.9	254	15.4	21
0311-96-0003	11-0015	0-0.5	3010	2.5	47.9	3	2.8	9.6	264	7.4	29
0311-96-0004	11-0016	0.5-1	2850	2.2	37.3	2.8	1.7	5.5	204	7.1	17.1
0311-96-0005	11-0017	0-0.5	3630	3.1	60.1	3.3	3.8	11.6	300	7.7	35.7
0311-96-0006	11-0018	1.5-2	5610	2.5	151	4	4.6	5.4	324	14.8	18.7

**APPENDIX E      CERTIFICATE OF COMPLETION**

111-1-10700-61473

## CERTIFICATION OF COMPLETION

I certify that all the work pertaining to the Voluntary Corrective Action Report has been completed in accordance with the Department of Energy approved VCA plan entitled VCA Plan for Potential Release Site II-001(c). Based on my personal involvement or inquiry of the person or persons who managed this cleanup, a review of all data gathered and a visit to the site, to the best of my knowledge and belief, all criteria of the plan have been met or exceeded. I believe that the completion of this VCA is both protective to human health and the environment. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

  
\_\_\_\_\_  
Field Unit 3 Field Project Leader  
Environmental Restoration Project  
Los Alamos National Laboratory

9/12/96  
Date Signed

